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Distribution of the serotonin 5-HT₂ receptor family mRNAs: comparison between 5-HT_{2A} and 5-HT_{2C} receptors.

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Because of their similarities, serotonin 5-HT₂, 5-HT_{1C}, and the recently described 5-HT_{2F} receptors have been classified as members of the 5-HT₂ receptor family, and they have been renamed 5-HT_{2A}, 5-HT_{2C} and 5-HT_{2B}, respectively. The regional distribution and cellular localization of mRNA coding for the members of 5-HT₂ receptor family were investigated in consecutive tissue sections from the rat brain by in situ hybridization histochemistry. No evidence for the expression of 5-HT_{2B} receptor was found. High levels of 5-HT_{2A} (formerly 5-HT₂) receptor mRNA were observed only in few areas, as the frontal cortex, piriform cortex, ventro-caudal part of CA3, medial mammillary nucleus, the pontine nuclei and the motor cranial nerve nuclei in the brainstem, and the ventral horn of the spinal cord. The distribution of 5-HT_{2A} receptor mRNA is generally in good agreement with that of the corresponding binding sites, although discrepancies were sometimes observed. 5-HT_{2C} (formerly 5-HT_{1C}) mRNA was present at very high levels in the choroid plexuses. However, very high levels were also seen in many other brain regions, as the retrosplenial, piriform and entorhinal cortex, anterior olfactory nucleus, lateral septal nucleus, subthalamic nucleus, amygdala, subiculum and ventral part of CA3, lateral habenula, substantia nigra pars compacta, several brainstem nuclei and the whole grey matter of the spinal cord. These results confirm and extend previous observations that 5-HT_{2C} receptor mRNA is present in many brain areas in addition to those autoradiographically shown to have the corresponding binding sites and that 5-HT_{2C} receptor subtype is a principal 5-HT receptor in the brain. From the comparison between their distributions, 5-HT_{2A} and 5-HT_{2C} receptor mRNAs appeared to be expressed in distinct but overlapping sets of brain regions. Both mRNAs coexisted at high levels in the anterior olfactory nucleus, piriform cortex, endopiriform nucleus, claustrum, pyramidal cell layer of the ventral part of CA3, taenia tecta, substantia nigra pars compacta,

and several brainstem nuclei. In other regions both mRNAs were present but with different distributions, as the caudate-putamen. These results are also discussed in relation to the physiological meaning of the existence of two so similar receptor subtypes in the brain.

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